

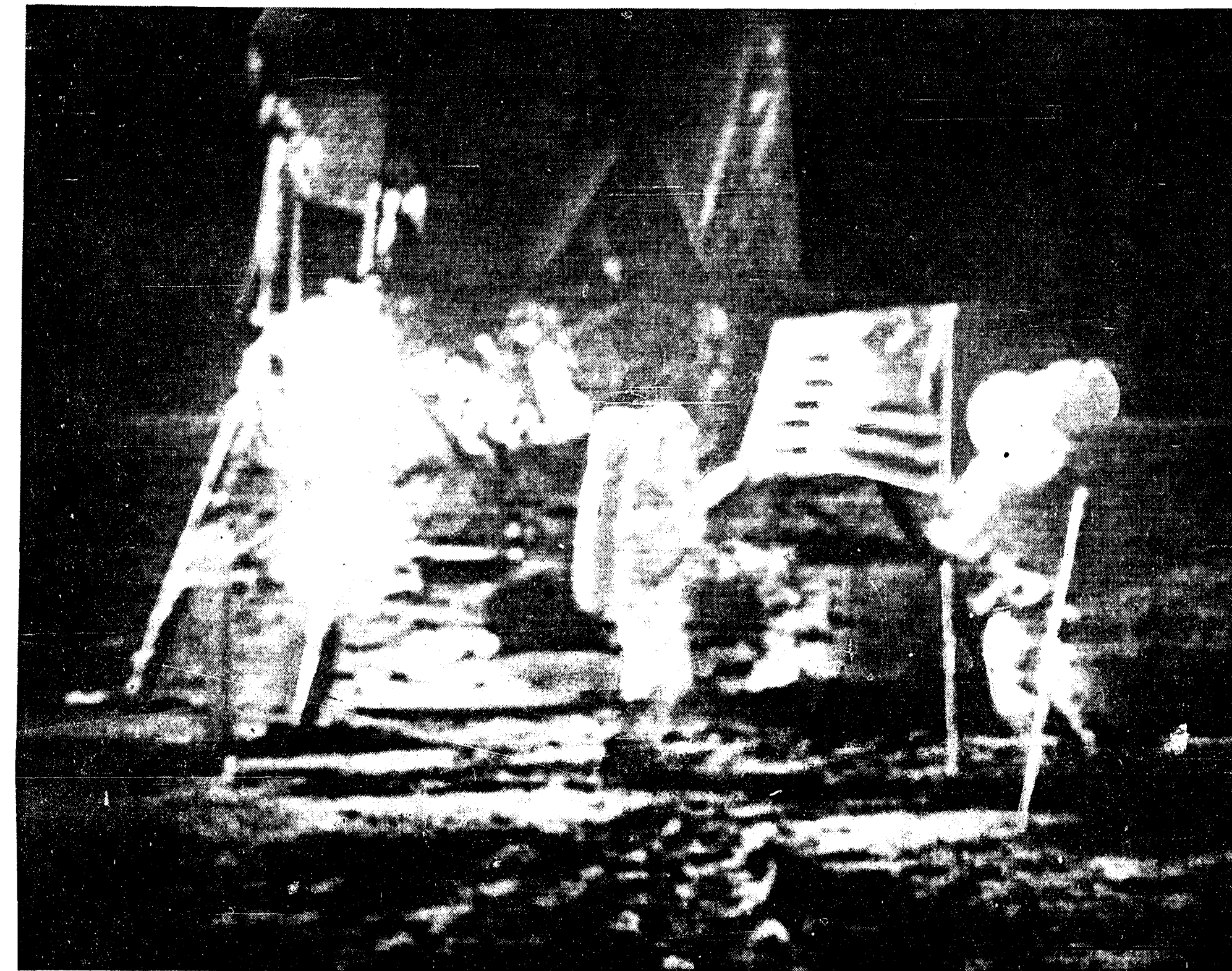
'One Small Step For Man ... Giant Leap for Mankind': American Flag Planted Amazingly Clear Pictur...

By Thomas O'Toole Washington Post Staff Writer

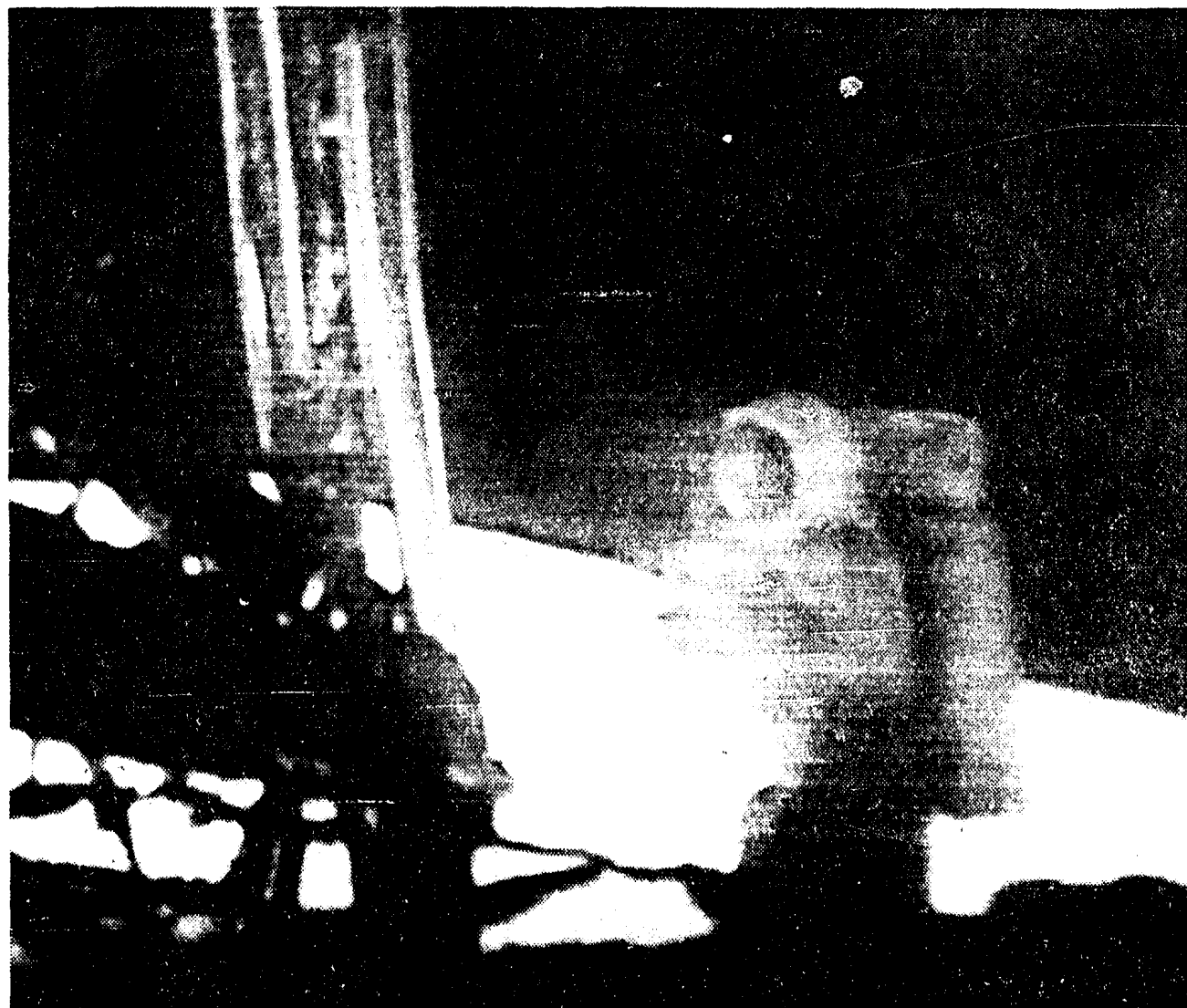
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Neil Armstrong and Edwin Aldrin plant the American flag on the surface of the moon. The flag is kept "flying" on the airless moon by a spring device.



Armstrong takes his first steps on the moon. At left is the Eagle, the lunar landing craft.

'One Small Step For Man ... Giant Leap for Mankind'

By Thomas O'Toole
Washington Post Staff Writer

HOUSTON, July 20—Man stepped out onto the moon tonight for the first time in his two-million-year history.

"That's one small step for man," declared pioneer astronaut Neil Armstrong at 10:56 p.m. EDT, "one giant leap for mankind."

Just after that historic moment in man's quest for his origins, Armstrong walked on the dead satellite and found the surface very powdery, littered with fine grains of black dust.

A few minutes later, Edwin (Buzz) Aldrin joined Armstrong on the lunar surface and in less than an hour they put on a show that will long be remembered by the worldwide television audience.

American Flag Planted

The two men walked easily, talked easily, even ran and jumped happily so it seemed. They picked up rocks, talked at length of what they saw, planted an American flag, saluted it, and talked by radiophone with the President in the White House, and then faced the camera and saluted Mr. Nixon.

"For every American, this has to be the proudest day of our lives," the President told the astronauts. "For one priceless moment in the whole history of man, all the people on this earth are truly one."

Seven hours earlier, at 4:17 p.m., the Eagle and its two pilots thrilled the world as they zoomed in over a rock-covered field, hovered and then slowly let down on the moon. "Houston, Tranquillity base here," Armstrong radioed. "The Eagle has landed."

At 1:10 a.m. Monday—2 hours and 14 minutes after Armstrong first stepped upon the lunar surface—the astronauts were back in their moon craft and the hatch was closed.

In describing the moon, Armstrong told Houston that it was "fine and powdery. I can kick it up loosely with my toe.

"It adheres like powdered charcoal to the boot," he went on, "but I only go in a small fraction of an inch. I can see my footprint in the moon like fine grainy particles."

Armstrong found he had such little trouble walking on the moon that he began talking almost as if he didn't want to leave it.

"It has a stark beauty all its own," Armstrong said. "It's like the desert in the Southwestern United States. It's very pretty out here."

Amazingly Clear Picture

Armstrong shared his first incredible moments on the moon with the whole world, as a television camera on the outside of the wingless Eagle landing craft sent back an amazingly clear picture of his first steps on the moon.

Armstrong seemed like he was swimming along, taking big and easy steps on the airless moon despite the cumbersome white pressure-suit he wore.

"There seems to be no difficulty walking around," he said. "As we suspected, it's even easier than the one-sixth G that we did in simulations on the ground."

One of the first things he did was to scoop up a small sample of the moon with a long-handled spoon with a bag on its end like a small butterfly net.

"Looks like it's easy," Aldrin said, looking down from the Lem.

"It is," Armstrong told him. "I'm sure I could push it in farther but I can't bend down that far."

Guides Aldrin Down Ladder

At 11:11 p.m., Aldrin started down the landing craft's ten-foot ladder to join Armstrong.

Backing down the nine-step ladder, Aldrin was guided the entire way by Armstrong, who stood at the foot of the ladder looking up at him.

"Okay," Armstrong said. "watch your 'pliss' (PLSS, for portable life support system) from underneath. Drop your pliss down. You're clear. About an inch clear on your pliss."

"Okay," Aldrin said. "You need a little arching of the back to come down."

After he stepped onto the first rung of the ladder, Aldrin went back up to the Lem's "front porch" to partially close the Lem's hatch.

"Making sure not to lock it on my way out," he said in comic fashion. "That's our home for the next couple of hours and I want to make sure we can get back in."

"Beautiful," said Aldrin when he met Armstrong on the lunar surface.

"Isn't that something," said Armstrong. "It's a magnificent sight out here."

See APOLLO, A9, Col. 1

Armstrong, Aldrin Become First Men to Walk on Moon

While Armstrong watched, Aldrin went through some cautious walking experiments to see how difficult it was in his pressure suit.

"Reaching down is fairly easy," he said. "The mass of the backpack does have some effect on inertia. There's a slight tendency, I can see now, to tip backwards."

Aldrin and Armstrong then both walked around the Lem's 31-foot base, inspecting its four legs and undercarriage at the same time that they began looking over the moon's surface.

"These rocks are rather slippery," Armstrong said. "The powdery surface fills up the fine pores on the rocks, and we tend to slide over it rather easily."

While Armstrong got ready to move the television camera out about 30 feet from the Lem, Aldrin did some more experimental walking.

"If I'm about to lose my balance in one direction," said Aldrin. "Recovery is quite natural and easy. You've just got to be careful leaning in the direction you want to go in."

At that, Aldrin apparently spotted an interesting rock. "Hey, Neil," he said. "Didn't I say we'd find a purple rock?"

"Did you find a purple rock?" Armstrong asked him. "Yep," replied Aldrin.

The next thing Armstrong did was to change lenses on the television camera, putting a telephoto lens on it for a closeup view of what was happening.

"Now we'll read the plaque for those who haven't read it before," Armstrong said, referring to a small stainless steel plaque that had been placed on one of the landing craft's legs.

"It says," Armstrong said, "Here men from the planet Earth first set foot on the moon. July 1969, A.D. We came in peace for all mankind."

"It has the crew members' signatures," Armstrong said, "and the signature of the President of the United States."

Bleak But Beautiful

Armstrong next took the television camera out to a spot about 40 feet from the Lem, and placed it on a small tripod.

Incredibly clear, the picture showed a distant Lem, squatting on the bleak but beautiful lunar surface like some giant mechanical toy. It appeared to be perfectly level, not at all tilted on the rough lunar terrain.

When he got the camera mounted correctly, he walked back toward the Lem, with the camera view following him all the way.

Just after 11:30, both men removed a pole, flagstaff and a plastic American flag from one of the Lem's legs. They gently pressed the flag into the lunar surface.

After they saluted the flag, astronaut Bruce McCandless commented on the little ceremony from his perch in the Manned Spacecraft center's mission control room.

"The flag is up now," he said. "You can see the stars and stripes on the lunar surface."

At 11:48 McCandless asked both men to stand together near the flag. "The President of the United States would like to talk to you," McCandless said.

Mr. Nixon spoke to the astronauts for almost two minutes, and when he finished, the two astronauts stood and saluted directly at the television camera.

During most of their early time on the moon, astronaut Michael Collins not only didn't see them walking on the moon, but was behind the moon and out of radio touch in his orbiting command craft.

When he finally swung around in front of the moon again, Armstrong and Aldrin had been out almost 15 minutes.

"How's it going?" Collins asked plaintively. "Just great," McCandless told him. "How's the television?" he asked. "Just beautiful," he was told.

Armstrong and Aldrin stayed out on the moon for almost two hours, with Aldrin first back into the Lem just before 1 a.m. Monday.

"Adios, Amigos," he said as he pulled himself easily back up the ladder.

Armstrong started back up the ladder a few minutes after 1 a.m. Monday. He took what seemed like four rungs with one huge leap upward. At 1:10 a.m., Armstrong had joined Aldrin inside the cabin. "Okay, the hatch is closed and latched," said Aldrin seconds later.

When both men had repressurized their cabin and taken off their helmets and gloves, Collins reappeared over the lunar horizon in his command craft. At once he asked how everything had gone.

Sleep. Then Rendezvous. "Hallelujah," he said when he was told what had happened.

All three astronauts were due to get their first sleep almost 24 hours, a sleep that was never more richly served.

If nothing went wrong — and nobody was expecting anything would — Armstrong and Aldrin were due to get back off the surface of the moon at 1:55 p.m. EDT Monday.

Burning their ascent engine full-blast for just over seven minutes, they will start a four-hour flight to rejoin Collins and the command craft 70 miles above the lunar surface.

The majestic moment of man's first steps on the moon came about six hours after Armstrong and Aldrin set their four-legged, wingless landing craft down in the moon's Sea of Tranquility—precisely at 4:17 p.m. EDT.

"Houston, Tranquility Base here," Armstrong announced to a breathless world. "The Eagle has landed."

"You did a beautiful job," astronaut Charles Duke said from Houston's Manned Spacecraft Center. "Be advised there's lots of smiling faces down here."

"There's two of them down here," Armstrong replied. "The landing apparently was not an easy one. It was about four miles from the target point in the southwestern edge of the Sea of Tranquility, almost right on the lunar equator."

"We were coming down in a crater the size of a football field with lots of big rocks around and in it," Armstrong said about five minutes after landing. "We had to fly it manually over the rock field to find a place to land."

"Every Variety of Shapes"

A few minutes later, Aldrin gave a waiting world its first eyewitness description on the moon's surface. "It looks like a collection of just about every variety of shapes and angularity, every variety of rock you could find," Aldrin said.

"There doesn't appear to be too much color," he went on, "except that it looks as though some of the boulders are going to have some interesting color."

Armstrong then described their landing site in detail. "It's a relatively flat plain," he said, "with a lot of



Neil Armstrong, left, and Edwin Aldrin, center, are in the lunar module. Michael Collins is in the orbiting main ship.

20 to 30 feet high. Thousands of little one- and two-foot angular leaves in front of us two feet in front of us. There's a hill in view ahead of us. It might be a half-mile or a mile away."

Armstrong then described what he said were rock fractures by the exhaust of Eagle's rocket plume.

"Some of the surface rocks in close look like they might have a coating on them," he said. "Where they're broken, they display a very dark gray interior. It looks like it could be country basalt."

"Like Being in an Airplane"

Both men seemed to actually enjoy being in the moon's gravity, which is one-sixth that of earth's.

"It's like being in an airplane," Armstrong said. "It seems immediately natural to move around in this environment."

Armstrong and Aldrin apparently felt fine. Armstrong's heart rate went as high as 156 beats per minute at the time of landing, but dropped down into the nineties minutes later.

The time leading up to the landing is difficult to describe, except to say that it was as dramatic a time as any in memory.

It all began at 3:08 p.m. EDT when Armstrong and Aldrin—flying feet first and face down—fired up the landing craft's descent engine for the first time.

Burning the engine for 27 seconds in what amounted to a braking maneuver to slow it down and start it falling, the two men were behind the moon at the time and out of radio touch with earth.

It was not until 3:47 p.m. that the men at the Manned Spacecraft Center heard that Armstrong and Aldrin were on their way down—and they heard it first from Collins, who flew from behind the moon in the command craft above and in front of the landing craft.

"Columbia, Houston," said Duke from the Center. "How did it go?"

"Listen, Babe," replied an excited Collins. "Everything's going just swimmingly. Beautiful."

Two minutes later, Duke made radio contact with Armstrong and Aldrin.

"We're standing by for your burn report," Duke said. "The burn was on time," Aldrin told him.

"Rog, copy," Duke said. "Looks great." At this point, the men in Mission Control bent their backs to the toughest jobs they'd ever have—following the two spacecraft at all times, to give them the guidance they would need for the Eagle's descent to the moon.

"Just Play It Cool"

Looking around the very quiet Mission Control room, flight director Gene Kranz simply said, "We're off to a good start. Just play it cool."

Flying down and westward across the moon's surface, the Eagle suddenly dropped out of radio contact with earth, but in moments was back in touch again.

"I don't know what the problem was," a totally comatose Buzz Aldrin said when he came back on. "We started yawing and we're picking up a little oscillation rate now."

Still falling, the Eagle was coming up over the eastern region of the Sea of Tranquility at an altitude of 53,000 feet and only minutes away from its second critical maneuver—the powered descent to the lunar surface.

"Five minutes to ignition," Duke radioed up. "You are going for a powered descent."

"Roger," Armstrong replied softly. "Understand." At 4:05, Armstrong began throttling up the engine to slow the Eagle again, to drop it down toward the lunar surface.

"Light's on," he said. "Descent looks good." Two minutes later, it was plain to everybody listening that they were indeed on their way down to the moon.

"Show an altitude of 47,000 feet," Armstrong said. "Everything looking good."

Still calm, Aldrin said he noticed a few warning lights coming on inside the spacecraft. "I'm getting some AC voltage fluctuations," he said, "and our position checks show us to be a little long."

"You're looking good to us, Eagle," Duke answered. "You are going to continue powered descent. Repeat. You are go to continue powered descent."

Falling, Slowing Approach

"Altitude 27,000 feet," Aldrin read off. "This throttle is better than the simulator."

Down they came, still falling but slowing down at the same time. At 21,000 feet, their speed had fallen to 80 miles an hour.

"You're looking great to us, Eagle," Duke said. A minute later, it was 500 miles an hour, then it was suddenly down to less than 90 miles an hour.

"You're looking great at eight minutes," Duke told them. "You're looking great at nine minutes," Duke told them.

At this point, the two explorers began their final approach to the moon's surface, coming in sideways and downwardly only 5200 feet above the moon.

When the Eagle dropped to 4200 feet Duke broke in on the radio, his voice tense and excited.

"Eagle, you are go for landing," he said.

Telecast.

After completion of live black and white telecast during lunar surface activities no further TV scheduled until Tuesday, 9:02 to 9:17 p.m. when Columbia will be on transearth coast headed back to earth.

"We've done everything humanly possible," Manned Spacecraft Center Director Robert C. Gilruth told one newsman, "but boy is this a tense and unreal time for me."

Preparing for the busiest and most historic day of their lives, the three crewmen hadn't even gotten to sleep until after 1 a.m.—and it was the ground that suggested they all go to bed.

"That really winds things up as far as we're concerned," astronaut Owen Garriott said in Houston. "We're ready to go to bed and get a little sleep."

Collins Wakes Up First

"Yeah, we're about to join you," Armstrong replied. Armstrong and Aldrin were the first to go to sleep, and then Collins finally went to sleep two hours later, at just after 3 a.m.

Four hours later, astronaut Ron Evans was manning the radio in Houston and he put in the first wake-up call. "Apollo 11, Apollo 11," he said. "Good morning from the black team."

It was Collins who answered first, even though he'd had the least sleep. "Oh my, you guys wake up early," he said. "You're about two minutes early on the wakeup," Evans conceded. "Looks like you were really saving them away."

"You're right," said Collins. Everybody got right down to business then. "Looks like the command module's in good shape," Evans told Collins. "Black team's been watching it real closely for you."

"We sure appreciate that," Collins said, "because I sure haven't."

Activates Landing Craft

Just after 9:30 a.m., as the three men began their 11th orbit of the moon, Aldrin got into the Eagle for the first time—to power it up, start the oxygen flowing into the spacecraft and make sure everything was in working order. Forty-five minutes later, Armstrong joined him.

On the 13th orbit, Eagle undocked from Columbia, moving off about 40 or 50 feet from the command craft, which Collins was piloting alone.

Like most of the maneuvers they've made, this one was done behind the moon and out of contact with earth—so nobody in Houston knew for almost 45 minutes if the separation had been successful.

At 1:50 p.m., the two spacecraft came over the moon's rim.

"Eagle, we see you on the steerable," said Duke, who had just replaced Evans. "How does it look?"

"Eagle has wings," was Armstrong's simple reply. For a while, all the astronauts did was look each other over, to make sure the two spacecraft were shipshape.

"Check that tracking light, Mike," Armstrong told Collins. "Okay," Armstrong said next. "I'm ready to start my yaw maneuver if it suits you, Mike."

Elaborate Instrument Check

Aldrin got on next, reading off what seemed like endless instrument checklists. For 15 minutes, he talked on, never once missing a word, sounding totally composed.

At 2:12 p.m., Collins fired his tiny thruster jets to increase distance between the craft.

"Thrusting," Collins said. "Everything's looking real good."

The two spacecraft were 1000 feet away from each other within moments. Collins took a radar check on the distance.

"I got a solid lock on it," he said. "It looks like point 27 miles"—about 1400 feet.

"Hey," Collins said to Armstrong when he'd looked out his window, "you're upside down."

"Somebody's upside down," Armstrong replied. Just then, Collins asked Armstrong: "Put your tracking light on, please."

"It's on, Mike," answered Aldrin. "Give us a mark when you're at seven-tenths of a mile," Duke said to Collins from the ground.

Moments later, Duke told Collins the big radars on the ground showed the two spacecraft seven-tenths of a mile apart.

"Rog," Collins said. "I'm oscillating between point-69 and seven-tenths."

At 2:50 p.m. Houston gave the go signal for the first maneuver, the so-called descent orbit insertion burn.

"Eagle," Duke said, "you are go for DOI."

"Roger," replied Aldrin matter-of-factly. "Go for DOI." And while the whole world listened one of the most majestic dramas in mankind's history began to unfold.

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Among the items that the Astronauts will leave behind when they return to earth are: 1—Rod support for solar wind experiment. 2—American flag. 3—Laser beam reflector to allow scientists on earth to measure distance to moon. 4—Descent stage of Lem. 5—Television camera.

6—A Gnomon. This device permits verification of colors of objects photographed by crew. 7—One of two life-support systems. 8—Extension handle for tools, a scoop and a pair of tongs. 9—A seismology experiment. This device will measure and transmit data regarding lunar quakes.



"Man on the moon TV received on earth at Parkes, Australia."

Position
July 19

Moon's orbital path